


<b>EASA</b>	<b>CERTIFICATION MEMORANDUM</b>
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## **Subject**

### **Fuel Specification Changes**

## Log of Issues

Issue	Issue date	Change description
01	28.02.2013	First issue.

## Table of Contents

<b>1. INTRODUCTION</b> .....	<b>4</b>
1.1. Purpose and Scope .....	4
1.2. References .....	4
1.3. Abbreviations .....	5
1.4. Definitions .....	6
<b>2. BACKGROUND</b> .....	<b>6</b>
<b>3. EASA CERTIFICATION POLICY</b> .....	<b>7</b>
3.1. EASA Policy .....	7
3.2. Who this Certification Memorandum Affects .....	9
3.3. Contact Details of Aviation Fuel Standardisation Bodies .....	9
<b>4. REMARKS</b> .....	<b>9</b>

# 1. INTRODUCTION

## 1.1. PURPOSE AND SCOPE

The purpose of **this** Certification Memorandum is to provide specific guidance for applicants when demonstrating compliance with CS-E 40(d) (AMC E 40(d)(3)(c)), CS-E 560(a), CS 23.901(e), CS 23.1521(d), CS 23.1522, CS 23.1557(c)(1), CS 23.1583 (b)(1), CS 25.901(b)(1), CS 25.1521(c)(2), CS 25.1557(b)(1), CS 25.1583 (b)(1), CS 25.901(c)(1), CS 27.901(c)(1), CS 27.1521(d), CS 27.1557(c)(1), CS 27.1583 (b), CS 29.901(b)(1), CS 29.1521(d), CS 29.1557(c)(1), 29.1583(b), CS-APU 20 (AMC CS-APU 20 (4)(i)) which requires the identification of the specification of fuel.

## 1.2. REFERENCES

It is intended that the following reference materials be used in conjunction with this Certification Memorandum:

Reference	Title	Code	Issue	Date
CS-APU 20	APU Configuration, Installation and Interfaces	CS-APU	initial	17 Oct 2003
CS-E 20	Engine Configuration and Interfaces	CS-E	3	23 Dec 2010
CS-E 40 (d)	Ratings	CS-E	3	23 Dec 2010
CS-E 560 (a)	Fuel System	CS-E	3	23 Dec 2010
CS 23.901 (e)	Installation	CS-23	3	20 July 2012
CS 23.1521 (d)	Powerplant limitations	CS-23	3	20 July 2012
CS 23.1522	Auxiliary power unit limitations	CS-23	3	20 July 2012
CS 23.1557 (c)(1)	Miscellaneous markings and placards	CS-23	3	20 July 2012
CS 23.1583 (b)(1)	Operating limitations	CS-23	3	20 July 2012
CS 25.901 (b)(1) CS 25.901 (c)(1)	Installation	CS-25	12	13 July 2012
CS 25.1521 (c)(2)	Powerplant limitations	CS-25	12	13 July 2012
CS 25.1557 (b)(1)	Miscellaneous markings and placards	CS-25	12	13 July 2012
CS 25.1583 (b)(1)	Operating limitations	CS-25	12	13 July 2012
CS 27.901 (c)(1)	Installation	CS-27	2	17 Nov 2008
CS 27.1521 (d)	Powerplant limitations	CS-27	2	17 Nov 2008
CS 27.1557 (c)(1)	Miscellaneous markings and placards	CS-27	2	17 Nov 2008
CS 27.1583 (b)	Operating limitations	CS-27	2	17 Nov 2008
CS 29.901 (b)(1)	Installation	CS-29	2	17 Nov 2008

Reference	Title	Code	Issue	Date
CS 29.1521 (d)	Powerplant limitations	CS-29	2	17 Nov 2008
CS 29.1557 (c)(1)	Miscellaneous markings and placards	CS-29	2	17 Nov 2008
CS 29.1583 (b)	Operating limitations	CS-29	2	17 Nov 2008
FAA Advisory Circular 20-24C	Approval of propulsion fuels and lubricating oils	AC 20-24C	initial	29 July 2011

### 1.3. ABBREVIATIONS

The following abbreviations are used in this Certification Memorandum:

Abbreviation	Meaning
<b>AC</b>	<b>Advisory Circular</b>
<b>AFC</b>	<b>Aviation Fuels Committee (Defence Standards)</b>
<b>AFM</b>	<b>Aircraft Flight Manual</b>
<b>ALS</b>	<b>Airworthiness Limitation Section</b>
<b>ALS</b>	<b>Airworthiness Limitations Section (of the Maintenance Manual)</b>
<b>AMC</b>	<b>Acceptable Means of Compliance</b>
<b>APU</b>	<b>Auxiliary Power Unit</b>
<b>ASTM</b>	<b>American Society for Testing and Materials</b>
<b>CM</b>	<b>Certification Memorandum</b>
<b>CS</b>	<b>Certification Specification</b>
<b>Def Stan</b>	<b>Defence Standard</b>
<b>DOA</b>	<b>Design Organisation Approval</b>
<b>EASA</b>	<b>European Aviation Safety Agency</b>
<b>ETSO</b>	<b>European Technical Standard Order</b>
<b>FAA</b>	<b>Federal Aviation Administration</b>
<b>GM</b>	<b>Guidance Material</b>
<b>OEM</b>	<b>Original Equipment Manufacturer</b>
<b>RFM</b>	<b>Rotorcraft Flight Manual</b>
<b>SAE</b>	<b>Society of Automotive Engineers</b>
<b>SB</b>	<b>Service Bulletin</b>

<b>Abbreviation</b>	<b>Meaning</b>
<b>SL</b>	<b>S</b> ervice <b>L</b> etter
<b>STC</b>	<b>S</b> upplemental <b>T</b> ype <b>C</b> ertificate
<b>TC</b>	<b>T</b> ype <b>C</b> ertificate
<b>TCDS</b>	<b>T</b> ype <b>C</b> ertificate <b>D</b> ata <b>S</b> heet

## 1.4. DEFINITIONS

The following definitions are used in this Certification Memorandum:

<b>Definition</b>	<b>Meaning</b>
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## 2. BACKGROUND

As part of the certification (or qualification) processes for aircraft, engines and auxiliary power units, applicants are required to establish the list of fuel grades and fuel specifications, including the fuel additives specifications, which are compatible and fit for purpose with their product (aircraft, engine or APU).

The fuel specifications must be complied with when the products, parts or appliances are operated, and have therefore become operating limitations at aircraft level.

At aircraft level, the approved fuel specifications are considered as operating limitations, which shall explicitly be listed as such in the TCDS, AFM or RFM. It is the responsibility of the aircraft operator to ensure that the fuel used for its operation is in accordance with the specifications and limitations listed in the AFM or RFM.

Historically FAA and EASA have used the voluntary consensus standards from ASTM International or AFC (Defence Standards), and as such the publication of fuel specifications is outside the remit of the EASA. EASA however, given the strong developments in the aviation fuel sector participates in some of the fuel committees such as ASTM International or AFC (Defence Standards). EASA considers that a specification is applicable only once it has officially been approved and published by the relevant standardisation organisation.

This Certification Memorandum is intended to present the EASA policy on approval of fit for purpose fuels by means of appropriate specification control bodies and the inclusion of these fuel specifications in the aircraft AFM/RFM limitations.

## 3. EASA CERTIFICATION POLICY

### 3.1. EASA POLICY

#### a- Initial fuel and fuel additives approvals

It is not the intention of this Certification Memorandum to detail the certification activities associated with clearing a specific fuel or a specific additive for usage on an engine or an aircraft.

For engines or APUs, the list of approved fuels and additives should be recorded in the installation instructions established under CS E-20 or CS APU-20.

It is the aircraft Type Certificate Holder's responsibility to ensure at product level that the fuels are compatible with all aircraft parts, components and equipment, including the engine and APU (if relevant), throughout the operating envelope. The compatible fuels at product level will then be recorded in the list of approved fuels. See 3.1(b)

Any associated limitation (such as restriction of the operating envelope), operating procedure, servicing instructions (for instance, need for specific additives) or maintenance actions aimed at ensuring the correct functioning of the product (for instance, cleaning or overhaul of specific components, reinforced water sumping program) should also be established and recorded.

#### b- Record of the limitations

The list that specifies the approved fuels at product level is regarded as defining the Operating Limitations of that product.

When demonstrating compliance for those Operating Limitation paragraphs CS-E 40(d) (AMC E 40(d)(3)(c)), CS 23.1521(d), CS 23.1522, CS 23.1583 (b)(1), CS 25.1521(c)(2), CS 25.1583 (b)(1), CS 27.1521(d), CS 27.1583 (b), CS 29.1521(d), CS 29.1583(b), CS-APU 20 (AMC CS-APU 20 (4)(i)), the identification of the specification of fuel is required.

For engines and APUs, the list of compatible fuel and fuel additives (especially mandatory additives) should be given in the instructions for installing the engine or APU (ref CS-E 20, CS-APU 20). Some manufacturers may additionally choose to provide this information in other publications like Operating Manual, Service Information Letters (SL) or Service Bulletins (SB). In this case a statement should be added that the list of approved fuels and additives is based on the conditions of the engine certification tests, but is not necessarily compatible with aircraft fuel and/or additive requirements. The engine TC holder /APU ETSO holder should inform the aircraft TC holder about changes to the installation instructions. Fuel related mandatory maintenance instructions for engines/APUs should be listed in the ALS.

At aircraft level, the fuel designations and fuel additives are recorded in the aircraft TCDS and the AFM/RFM as a limitation. The fuel specifications are recorded in the aircraft TCDS and/or the AFM/RFM'. In addition, the relevant Certification Specification (CS) requires that the fuel filler openings are marked at or near the filler cover with the permissible fuel designations. It is normally accepted that if it is impractical to give the complete details through this marking, a generic wording (e.g. 'Jet A/A-1' or 'Jetfuel') combined with an appropriate reference to the aircraft flight manual is an acceptable means of compliance against CS 23/25/27/29.1557.

The fuel or additive specifications recorded in the AFM, intended to ensure that the operator complies with the limitations established during certification, should make reference to published documents available to the operators.

If relevant, the limitation should include the issue / revision of the specification(s) it is referring to.

Any associated limitations, procedures or instructions for continued airworthiness are recorded in approved manuals such as the AFM or the ALS.

c- Fuel Specifications and fuel additives changes and evolutions

Contrary to most other limitations, fuel chemical composition and fuel specifications are constantly evolving. Due to the increased activities in the development of jet fuels from non-conventional sources (e.g. coal, natural gas or biomass) and by non-conventional manufacturing processes, fuel specifications are now changing more frequently than in the past.

Because the approved fuels and fuel additives are operating limitations, a change to an existing fuel specification and/or fuel additives leading to a change in the list of approved fuels and/or additive listed in the AFM or RFM, or the introduction of a new fuel specification and/or additive at product level, is a major design change to the type design of the particular product (GM 21.A.91(3.3)(v)). Such changes include then:

- Change to the fuel specification issue or suffix number, if the list of approved fuels includes it; or
- The introduction of a new fuel specification.

TC/STC/ETSO-APU holders have to evaluate any effect on their products, and to prevent the incorporation of any changes that might have an adverse safety effect on their product.

Change to the fuel specification:

AFC and ASTM have established a protocol for changes to the jet fuel specifications and additives (including approval of fuel additives): ASTM D4054 (applicable in the latest revision) »Standard Practice for Qualification and Approval of New Aviation Turbine Fuels and Fuel Additives«. This procedure provides information about the qualification and approval process of changes to the fuel specification itself and gives details about the expected participation from TC/STC holders. The revised fuel specification will get an updated issue or suffix number.

There are two options for recording a fuel specification in the list of approved fuels:

1) Listing the fuel specification without issue or suffix number

The option of recording the specification root number only (without issue suffix number or revision level) requires that applicants and TC/STC/ETSO-APU holders can demonstrate that they have a robust system to follow all changes to the fuel specifications and to evaluate any effect on their products. One major element of such robust system is the active participation in the aviation fuel committee(s).

2) Listing the fuel specification with suffix number

The specification root number and the issue suffix number or revision level should be recorded when no robust system to follow the specification changes has been implemented (e.g. no participation in aviation fuel committees). In this case, the TC/STC holder should apply for a major design change to TC/STC each time the revision number changes.

EASA will review the implementation of procedures regarding fuel specification changes in the frame of the DOA surveillance.

Introduction of a new fuel specification:

Adding a new fuel specification to the list of approved fuels is a major design change because it changes the operating limitations.



## 3.2. WHO THIS CERTIFICATION MEMORANDUM AFFECTS

EASA has prepared this Certification Memorandum for the TC and STC applications concerning turbine engines and turbine engine powered aircraft (except turbine powered sailplanes [CS-22]) and for ETSO-APU applications.

Holders of TC or STC for turbine engines or turbine engine powered aircraft or holders of ETSO-APU should consider this Certification Memorandum to develop appropriate procedures in the frame of the Design Organisation Approval (DOA).

This Certification Memorandum is not applicable to piston engines and piston engine powered aircraft.

## 3.3. CONTACT DETAILS OF AVIATION FUEL STANDARDISATION BODIES

### 1. Aviation Fuels Committee (Defence Standards)

UK Defence Standardization  
Kentigern House  
65 Brown Street  
Glasgow  
G2 8EX  
United Kingdom  
Tel: +44 141 224 2531/2532  
Fax: +44 141 224 2503  
E-mail: [enquiries@dstan.mod.uk](mailto:enquiries@dstan.mod.uk)

### 2. ASTM International

ASTM Committee D02/Subcommittee D02.J0.01  
100 Barr Harbor Drive  
PO Box C700  
West Conshohocken, PA, 19428-2959  
USA  
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E-mail: [service@astm.org](mailto:service@astm.org)

## 4. REMARKS

1. Suggestions for amendment(s) to this EASA Certification Memorandum should be referred to the Certification Policy and Planning Department, Certification Directorate, EASA. E-mail [CM@easa.europa.eu](mailto:CM@easa.europa.eu) or fax +49 (0)221 89990 4459.

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